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NORTHERN REGIONAL RESEARCH LABORATORY 1/

The Northern Regional Research Laboratory recently established at Peoria, Illinois, is one of four large research laboratories established by the U. S. Department of Agriculture in the Bureau of Agricultural Chemistry and Engineering to conduct researches into and to develop new scientific, chemical, and technical uses and new and extended markets and outlets for farm commodities and the products and byproducts thereof. The initial research work of the Peoria laboratory will have to do with wheat, corn, and agricultural residues.

The building which houses this research Laboratory is a U-shaped structure of three stories. The base of the U, which is the front of the building, is 211 feet long and comprises the administrative offices, the library, and conference rooms. The sides or wings of the U are 258 feet long. One of these wings is completely occupied with research laboratories equipped for work in chemistry, physics, and biology. The other wing contains several laboratories and a pilot plant. The function of the pilot plant will be to test, on a scale large enough to determine its practicability for commercialization, any new use developed through research by the laboratory staff. In addition to the U-shaped building there is a service building containing the heating, air conditioning, and steam plants.

The Director of the Laboratory is Dr. O. E. May, who was formerly the Director of the U. S. Regional Soybean Industrial Products Laboratory at Urbana, Illinois. The work of the Laboratory will be carried on through the following Divisions:

Agricultural Motor Fuels Division

Mr. S. T. Schicktanz, Chief

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U. S. Department of Agriculture

The Agricultural Motor Fuels Division will operate a modern Fermentation plant having a capacity for producing 500 gallons of ethyl alcohol per day, or equivalent quantities of other chemical substances producible by fermentation. This plant is not intended for quantity production, primarily, but will be used to study yields, and processing costs, using a variety of agricultural materials (many of which have not been used heretofore commercially), and a wide range of process conditions. Such work is intended to evaluate the available crop surplus materials as fuel sources, at the same time attempting to effect economies in production cost. At present, fermentation products from grain are too expensive to compete directly with petroleum fuels.

1/ Prepared by the Northern Regional Research Laboratory and published in the American Miller, February 1941, pp. 36-33.

Production of fuels of agricultural origin, other than by fermentation, will also be attempted. For example, the Division will study the feasibility of generating producer gas from corncobs or other similar agricultural residues. This gas might be used for fuel and light in homes, or for motor power in internal combustion engines on farms or in factories where such materials are available. Experiments will also be conducted on the possible enrichment of known fuels by means of suspensions of carbonaceous matter. It is intended to make engine tests on all kinds of fuels, both for determining comparative economy and for securing optimum running conditions.

Agricultural Residues Division

Dr. E. C. Lathrop, Chief

The work of the Agricultural Residues Division consists of developing, from such materials as stalks, straw, hulls, and cobs, new products and improved methods for the production of previously developed products. In general, agricultural residues are of a fibrous character. The first approach to their utilization is to manufacture them into useful articles, such as building materials, fillers, etc., with as little chemical processing as possible. Chemically, these residues consist of cellulose, hemicelluloses, and lignin, and are suitable, therefore, under proper economic conditions of collection, storage, and processing, for the manufacture of paper pulp, alpha-cellulose used to make rayon, and cellulose plastics; for lignin and associated plastics used in the electrical, automotive, airplane, and building industries; for the fermentation industries in the making of solvents; and for the manufacture of complex organic chemicals. Processes of this general type will be carried through the laboratory and pilot plant stages looking toward industrial production.

Analytical and Physical Chemical Division

Dr. R. T. Milner, Chief

The Analytical and Physical Chemical Division has been organized to carry on studies on the composition of corn, wheat, and agricultural residues as affected by such factors as origin, variety, season, storage, disease, condition, et cetera; service work of an analytical nature for the other divisions; and fundamental research in fields that will give information of basic value to the work of the other divisions. The purpose of the studies on composition is to make possible the selection or development of varieties with a maximum of desirable properties for any particular industrial utilization.

Commodity Development Division

Mr. J. H. Shollenberger, Chief

The functions of the Commodity Development Division are: to collect grain and agricultural materials for use by the other divisions in their researches; to make field studies for determining the condition, supply, and availability of the various grains and agricultural residues for industrial use; to obtain industrial market information needed by other divisions in the development of new products from the agricultural materials with which they are working; to integrate the work of the Laboratory with that of the Bureau of Plant Industry, U. S. Department of Agriculture, and the agricultural experiment stations in the development of new strains, or methods of culture, for the production of corn and wheat possessing those particular qualities best adapted for industrial purposes; and to compile and correlate data resulting from the experiments of the Laboratory.

Engineering and Development Division

Dr. C. T. Langford, Acting Chief

The Engineering and Development Division will be concerned with engineering problems connected with the production of special equipment needed for research purposes and with the development of processes of production, and in many cases will carry out pilot-plant operations on laboratory processes.

Fermentation Division

Dr. R. D. Coghill, Chief

To the Fermentation Division has been assigned the problem of converting the commodities, corn, wheat, and agricultural residues, into useful industrial chemicals by means of fermentation processes. It is possible, in this way, to produce dozens of potentially valuable substances. For instance, ethyl alcohol, butyl alcohol, acetone, and citric, lactic, gluconic, and substituted gluconic acids are examples of chemicals already produced by fermentation. No work will be done by this Division on alcoholic beverages. In connection with this project, and as a necessary adjunct, a collection is being made of potentially useful yeasts, molds, and bacteria, this collection having already reached the size of several thousand species and strains of microorganisms.

Starch and Dextrose Division

Dr. G. E. Hilbert, Chief

Research work of the Starch and Dextrose Division will be conducted in the following broad fields: The properties of the starch granule at the various stages of its development; the properties of starch as influenced by the conditions of storage of the grain, and of processing for the production of starch; the structure and composition of starch granules; the modification of starch by physical and chemical agents; the structure of starch, modified starch, and starch derivatives; those properties of starch, starch granules, and starch derivatives which determine their use in particular industries; and the modification of dextrose by physical or chemical means, and determination of the properties of dextrose derivatives. In particular, such fundamental and practical information will be obtained as is required by industries for extending and developing new uses for starch and dextrose.

Oil and Protein Division

Dr. R. H. Manley, Acting Chief

The work of the Oil and Protein Division is divided into two fields of research indicated by its name. The oil work includes investigations in the field of polymerization phenomena to develop new and extended uses for vegetable oils and is divided into the following projects: the composition, processing, and industrial utilization of corn and wheat oils; the utilization of corn and wheat oils and derivatives of their fatty acid components for surface coatings; and isomerization, dehydrogenation, separation, and polymerization studies on derivatives of corn and wheat oil fatty acids with particular regard to utility of the products. The protein work of this Division consists of research on the development of methods for the commercial isolation of proteins, protein fractions, protein components, or their derivatives, from corn or corn processing residues, and on the development of uses for these materials.

Plans for the work of the Laboratory have been, and will be guided largely by advisory committees of expert scientists from Federal, State, and educational institutions. The Department of Agriculture also hopes for, and will welcome, the fullest possible cooperation from industry.

